CLAIMS

1. A rubber composition for a tire tread comprising 10-250 parts by weight of a carbon black per 100 parts by weight of a rubber component, in which the said carbon black is produced in a carbon black production step using a production furnace wherein a combustion zone, a reaction zone and a reaction stop zone are coaxially connected to each other and including a step of producing a high-temperature combustion gas through the combustion of hydrocarbon fuel in the combustion zone, a step of spraying a starting hydrocarbon into the high-temperature combustion gas flow in the reaction zone to convert the starting hydrocarbon into carbon black through partial combustion or thermal decomposition reaction and a step of quenching the high-temperature combustion gas flow with a quenching medium in the reaction stop zone to complete the reaction, under conditions satisfying the following relational equations (1) and (2):

$$2.00 \leq \alpha \leq 9.00 \quad \text{..... (1)}$$

$$-2.5 \times \alpha + 85.0 \leq \beta \leq 90.0 \quad \text{..... (2)}$$

when a residence time from the introduction of the starting hydrocarbon into the high-temperature combustion gas flow to the introduction of the quenching medium is t1 (sec), an average reaction temperature for such a time is T1 (°C), a residence time from the introduction of the quenching medium to the enter of a reaction gas flow into the reaction stop zone is t2 (sec), an average reaction temperature for such a time is T2 (°C), $\alpha = t1 \times T1$ and $\beta = t2 \times T2$.

2. A rubber composition for a tire tread according to claim 1, which is compounded with the carbon black produced in the carbon black production step that the α value and the β value satisfy the following relational equations (3) and (4):

$$3.00 \leq \alpha \leq 8.00 \quad \text{..... (3)}$$

$$-2.5 \times \alpha + 85.0 \leq \beta \leq 86.0 \quad \text{..... (4)}$$

3. A rubber composition for a tire tread according to claim 1 or 2, which is compounded with the carbon black produced in the carbon black production step further comprising a step of introducing a gaseous body in the reaction zone or the reaction stop zone.

4. A rubber composition for a tire tread according to any one of

claims 1-3, which is compounded with the carbon black having a dibutyl phthalate absorption (DBP) of 40-250 ml/100 g, a compressed DBP absorption (24M4DBP) of 35-220 ml/g and a cetyltrimethylammonium bromide adsorption specific surface area (CTAB) of 70-200 m^2/g.

5. A rubber composition for a tire tread according to claim 4, which is compounded with the carbon black having a dibutyl phthalate absorption (DBP) of 95-220 ml/100 g and a compressed DBP absorption (24M4DBP) of 90-200 ml/g.

6. A rubber composition for a tire tread according to claim 4 or 5, which is compounded with the carbon black having a tinting strength (TINT) > 0.363xCTAB+71.792.

7. A rubber composition for a tire tread according to claim 4 or 5, which is compounded with the carbon black having a tinting strength (TINT) < 0.363xCTAB+71.792 and (TINT) > 50.

8. A rubber composition for a tire tread according to any one of claims 1 to 7, which is compounded with the carbon black having a hydrogen desorption ratio > $0.260-6.25x10^{-4}$xCATB (wt%).

9. A rubber composition for a tire tread according to any one of claims 1 to 8, which is compounded with the carbon black having a toluene tinting permeability of not less than 90%.

10. A rubber composition for a tire tread according to any one of claims 1 to 8, which is compounded with the carbon black having an extraction amount with monochlorobenzene of not more than 0.15%.

11. A pneumatic tire characterized by using a rubber composition for a tire tread as claimed in any one of claims 1 to 10 in a tread portion.